THE AUTHENTICITY OF ARCHYTAS FR. 1

In a long note in his epoch-making book on ancient Pythagoreanism Walter Burkert raised some grave doubts about the authenticity of Archytas Fr. 1 which have recently been challenged in an article by A. C. Bowen.[1] In this paper I have two goals. First, I will evaluate Burkert's doubts and the success of some of Bowen's arguments against them. Second, I will present a further consideration that both clarifies the text of the fragment and also removes the most serious problem raised by Burkert. The upshot of both these points is to increase the likelihood that the fragment is authentic.

I reproduce the text of just the first part of the fragment as given in DK followed by the text as it appears in the two primary sources, Nicomachus and Porphyry.

DK i. 431–2

καλῶς μοι δοκοῦντι τοὶ περὶ τὰ μαθήματα διαγνώμεναι, καὶ οὐθὲν ἄτοπον ὀρθῶς αὐτούς, οἷά ἐντι, περὶ ἑκάστων φρονέειν· περὶ γὰρ τᾶς τῶν ὅλων φύσιος καλῶς διαγνόντες ἔμελλον καὶ περὶ τῶν κατὰ μέρος, οἷά ἐντι, καλῶς ὀψεῖσθαι. περί τε δὴ τᾶς τῶν ἄστρων ταχυτᾶτος καὶ ἐπιτολᾶν καὶ δυσίων παρέδωκαν ἁμὶν σαφῆ διάγνωσιν καὶ περὶ γαμετρίας καὶ ἀριθμῶν καὶ σφαιρικᾶς καὶ οὐχ ἥκιστα περὶ μωσικᾶς. ταῦτα γὰρ τὰ μαθήματα δοκοῦντι ἦμεν ἀδελφεά· περὶ γὰρ ἀδελφεὰ τὰ τῶ ὄντος πρώτιστα δύο εἴδεα τὰν ἀναστροφὰν ἔχει. πρᾶτον μὲν οὖν ἐσκέψαντο, ὅτι οὐ δυνατόν ἐστιν ἦμεν ψόφον μὴ γενηθείσας πληγᾶς τινων ποτ' ἄλλαλα. (The fragment continues)

Nic. *Arith.* p. 6.16–7.5 (Hoche)

ἀλλὰ καὶ Ἀρχύτας ὁ Ταραντῖνος ἀρχόμενος τοῦ ἁρμονικοῦ τὸ αὐτὸ οὕτω πως λέγει· καλῶς μοι δοκοῦντι περὶ τὰ μαθήματα διαγνώμεναι καὶ οὐδὲν ἄτοπον αὐτοὺς ὀρθῶς, οἷά ἐντι, περὶ ἑκάστου φρονέειν. περὶ γὰρ τᾶς τῶν ὅλων φύσιος καλῶς διαγνόντες ἔμελλον καὶ περὶ τῶν κατὰ μέρος, οἷά ἐντι, καλῶς ὀψεῖσθαι· περί τε δὴ τᾶς γεωμετρικᾶς καὶ ἀριθμητικᾶς καὶ σφαιρικᾶς παρέδωκαν ἄμμιν σαφῆ διάγνωσιν, οὐχ ἥκιστα δὲ καὶ περὶ μουσικᾶς. ταῦτα γὰρ τὰ μαθήματα δοκοῦντι ἔμμεναι ἀδελφεά· περὶ γὰρ ἀδελφεὰ τὰ τοῦ ὄντος πρώτιστα δύο εἴδεα τὰν ἀναστροφὰν ἔχει. καὶ Πλάτων δὲ ἐπὶ τέλει τοῦ τρισκαιδεκάτου τῶν νόμων ...

Por. *in Ptol. Harm.* p. 56 (During)

παρακείσθω δὲ καὶ νῦν τὰ Ἀρχύτα τοῦ Πυθαγορείου, οὗ μάλιστα καὶ γνήσια λέγεται εἶναι τὰ συγγράμματα. λέγει δ' ἐν τῷ Περὶ μαθηματικῆς εὐθὺς ἐναρχόμενος τοῦ λόγου τάδε·

"Καλῶς μοι δοκοῦντι τοὶ περὶ τὰ μαθήματα διαγνῶναι καὶ οὐθὲν ἄτοπον ὀρθῶς αὐτοὺς περὶ ἑκάστου θεωρεῖν. περὶ γὰρ τᾶς τῶν ὅλων φύσιος καλῶς διαγνόντες ἔμελλον καὶ περὶ τῶν κατὰ μέρος, οἷά ἐντι, ὄψεσθαι. περί τε δὴ τᾶς τῶν ἄστρων ταχυτᾶτος καὶ ἐπιτολᾶν καὶ δυσίων παρέδωκαν ἁμὶν διάγνωσιν καὶ περὶ γαμετρίας

καὶ ἀριθμῶν καὶ οὐχ ἥκιστα περὶ μουσικᾶς. ταῦτα γὰρ τὰ μαθήματα δοκοῦντι ἦμεν ἀδελφεά. πρᾶτον μὲν οὖν ἐσκέψαντο, ὅτι οὐ δυνατόν ἐστιν ἦμεν ψόφον μὴ γενηθείσας πληγᾶς τινων ποτ' ἄλλαλα. πλαγὰν δ' ἔφαν γίνεσθαι, ὅκκα...(the fragment continues).

Individual sentences from the fragment are also quoted in Iamblichus but they are irrelevant for present purposes (see DK i. 431).

It seems to me that while most of Bowen's attempts to respond to Burkert's doubts miss the mark, in one important case he is successful. Burkert had noticed that as the text is presented in DK the enumeration of μαθήματα in the fragment is strangely redundant. First there is mention of knowledge περί τε δὴ τᾶς τῶν ἄστρων ταχυτᾶτος καὶ ἐπιτολᾶν καὶ δυσίων and then of knowledge περὶ γαμετρίας καὶ ἀριθμῶν καὶ σφαιρικᾶς καὶ οὐχ ἥκιστα περὶ μωσικᾶς (DK i. 432, 4–7). The difficulty is that it is hard to see what difference there is between investigation of the speeds, risings, and settings of stars and the field of σφαιρικά. Bowen finds a neat solution to this dilemma by pointing out that the text of the passage in DK is a combination of the versions of the two sources for the text, Porphyry and Nicomachus. Only Nicomachus mentions σφαιρικά. In fact several features of Nicomachus' version (περί τε δὴ τᾶς γεωμετρικᾶς καὶ <u>ἀριθμητικᾶς</u> καὶ <u>σφαιρικᾶς</u> παρέδωκαν ἄμμιν σαφῆ διάγνωσιν, οὐχ ἥκιστα δὲ καὶ <u>περὶ μουσικᾶς</u>) are suspicious (as Bowen points out) and look rather like Nicomachus' own rewriting of the passage in later terminology.[2] We should thus accept the version of the passage which is given by Porphyry (περί τε δὴ τᾶς τῶν ἄστρων ταχυτᾶτος καὶ ἐπιτολᾶν καὶ δυσίων παρέδωκαν ἁμὶν διάγνωσιν καὶ περὶ γαμετρίας καὶ ἀριθμῶν καὶ οὐχ ἥκιστα περὶ μουσικᾶς) with the addition of σαφῆ before διάγνωσιν, which is suggested by Nicomachus' version.[3]

However, this resolves just one of the difficulties with the fragment, and not the most important one at that. The most serious problem concerns the sentence περὶ γὰρ ἀδελφεά τὰ τῶ ὄντος πρώτιστα δύο εἴδεα τὰν ἀναστροφὰν ἔχει (DK i. 432, 8–9; underlined above). This sentence immediately follows upon the assertion that the μαθήματα which Archytas lists are ἀδελφεά and provides an argument for that assertion. They are sister sciences because 'they are concerned with the two foremost kinds of being'. At first sight what the 'two foremost kinds' of being might be seems rather a puzzle. There is no evidence elsewhere for Archytas having postulated two primary kinds of being nor does the phrase seem explicable in terms of any philosophical system of the fifth or fourth century including Plato and Aristotle. However, if we read the pages in Nicomachus which immediately precede the quotation of the Archytas fragment the answer becomes clear. Nicomachus bases his own account of the μαθήματα on two basic kinds of being, πλῆθος and μέγεθος (Ar. 1.2ff.). He specifically refers to them as δύο εἴδη at Ar. 4.20. Thus it is likely that the two foremost kinds of being mentioned in the Archytas fragment are πλῆθος and μέγεθος. Since the only parallel for this idea is found much later than Archytas in Nicomachus, the fragment begins to look very suspect.[4]

Bowen's response to this difficulty goes astray. He argues that Plato and Aristotle did distinguish between πλῆθος and μέγεθος in many places (e.g. *Charmides* 118 b 2–8).[5] However, the point is surely that neither Plato nor Aristotle made this a

[2] See Bowen, pp. 84–5.   [3] See Bowen in his text.
[4] See Burkert, p. 380 n. 46.
[5] Bowen, p. 85. He says that the distinction between multitude and magnitude was 'commonplace in fifth and fourth century thought'. This is surely true, but it was *not* commonplace to call multitude and magnitude the primary two kinds of what is.

fundamental distinction in his metaphysics nor do they give any indication that any
other thinker had done so. If the text as DK presents it were acceptable, this mention
of the two primary kinds of being would be very strong evidence against its
authenticity.

However, we only have to compare the two primary sources for the text to see the
solution to the problem. The entire offending sentence (περὶ γὰρ ἀδελφεὰ τὰ τῶ ὄντος
πρώτιστα δύο εἴδεα τὰν ἀναστροφὰν ἔχει) only occurs in Nicomachus. It is not found
in Porphyry. It is thus clear that the sentence which is so closely tied to Nicomachus'
own views propounded only a few pages earlier must have been inserted by
Nicomachus to explain the preceding sentence of Archytas (ταῦτα γὰρ τὰ μαθήματα
δοκοῦντι ἤμεν ἀδελφεά) in Nicomachean terms. This suggestion receives even further
support when we realise that the sentence in question is the last line of Archytas (if
it is Archytas) that Nicomachus quotes. Only Porphyry gives the rest of the fragment.
Thus the truth would appear to be that the last line of Archytas that Nicomachus
actually quoted was the assertion that the sciences are sisters. The explanation of this
assertion in terms of two kinds of being belongs to Nicomachus.

The grammar and style of the offending sentence also show that it does not fit with
the rest of the quotation and must be a remark of Nicomachus. First, in the
immediately preceding sentence τὰ μαθήματα takes the plural verb δοκοῦντι whereas
in the sentence in question τὰ μαθήματα (understood) has the singular ἔχει as its verb.
Such inconsistency in two successive sentences is not easily ascribed to a single author.
The singular is standard grammar and what we would expect from Nicomachus.
Second, the meaning of ἀναστροφή found in the expression τὰν ἀναστροφὰν ἔχει = 'is
concerned with' finds most parallels in the Hellenistic period or later. True, to judge
from the word index in Hoche's edition of Nicomachus, the phrase is not used
elsewhere in the *Introduction to Arithmetic*, but the entries in LSJ for the second major
range of meanings of ἀναστροφή (dwelling, mode of life, occupation or concern) refer
mainly to authors such as Polybius, Plutarch, and Philodemus. Thus both the
philosophical sense of the sentence and its grammar and style show that it can be
confidently ascribed to Nicomachus and not Archytas.[6]

But, it might be objected, the offending sentence is in Doric and thus can hardly
be the work of Nicomachus. However, the context of the fragment in Nicomachus
is such that it is not implausible that a scribe would have 'corrected' the sentence by
putting it into Doric. None of the changes presuppose any profound knowledge of
Greek dialects. The sentence in question is a one-line statement that follows
immediately on the quotation in Doric from Archytas and is in turn immediately
followed by another sentence that refers to Plato by name in its first words. Not
understanding that the sentence is Nicomachus' own comment on Archytas the scribe
assumes that the Archytas fragment must continue up to the mention of Plato which
begins the next line and accordingly puts Nicomachus' one-line comment into Doric.

At this point the two most problematic aspects of the fragment have been addressed.
A few difficulties remain, but once the primary reason for doubt is removed they are
not enough to constitute serious doubt of the fragment's authenticity.

The first point is that half the fragment is taken up with Archytas' reports of his
predecessors' findings in indirect discourse. The problem is not just that Archytas thus
appears as the 'mere transmitter of Pythagorean wisdom' but also that this is the role
that Archytas is assigned in the apocryphal tradition that portrays him as locating
texts of Ocellus for Plato (D. L. 8.80). Thus, it might appear that Fragment 1 is a forged

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[6] Bowen keeps the line in his text.

document portraying Archytas in the same role of transmitter as he played regarding the texts of Ocellus.⁷ Such a point could be used to support other stronger evidence for spuriousness, but it is too weak to stand on its own. There are parallels for similar praise of predecessors (Hippoc. *Vict.* 1.1, *Hebd.* 53).⁸

Most serious is the doubt raised by the close correspondence between the sentence on 'sister sciences' in Archytas (ταῦτα γὰρ τὰ μαθήματα δοκοῦντι ἦμεν ἀδελφεά) and *Republic* 530d (καὶ αὗται ἀλλήλων ἀδελφαί τινες αἱ ἐπιστῆμαι εἶναι [sc. κινδυνεύουσι], ὡς οἵ τε Πυθαγόρειοί φασι...). In Archytas the 'sister sciences' are the quadrivium, while in Plato the reference is most immediately to astronomy and harmonics.⁹ Given the similarity between the passages it is possible to see the influence going either way. However, the point is that it is amazing if just *this* text of Archytas which Plato is referring to should be preserved. Such a coincidence might lead us to suspect that someone forging in the name of Archytas drew this line directly out of Plato. Plato assigns the idea to Pythagoreans, so the forger sees this as something safe to admit into his work by 'Archytas'.¹⁰ Once again this point has some force, but it is only conclusive if there are other features of the fragment that betray the forger. If the fragment otherwise avoids the sophisticated Platonic and Aristotelian terminology that is typical of the pseudo-Pythagorean literature, the similarity with the *Republic* is best explained as a result of Plato's having read this passage of Archytas, however great the coincidence that just this bit of Archytas should be preserved.¹¹

The remaining difficulty concerns the use of the word μαθήματα in the fragment. Burkert argues that it is a post-Platonic usage. It would thus be the type of linguistic evidence that would indicate that we are dealing with a pseudo-Pythagorean writing and would provide the background in which the correspondence with the *Republic* discussed above would be suspicious. But how clear is it that μαθήματα is used in a post-Platonic sense?

Generally speaking Plato uses μάθημα to refer to any sort of study and not just the mathematical studies that became the quadrivium (arithmetic, geometry, astronomy, and music). However, in *Republic* VII Plato already gives special status to certain μαθήματα, and in the *Laws* (817e) he refers to a special group of τρία μαθήματα (= arithmetic, geometry, and astronomy). Even more pertinent is the fact that at *Theaetetus* 145a Theodorus is portrayed as teaching the quadrivium of geometry, astronomy, harmony, and arithmetic. Unless Plato is being wildly ana-chronistic, it appears that already at the end of the fifth century four μαθήματα had a special status of some sort. It is true that a technical sense of μαθήματα referring to a set body of mathematical studies does appear in the post-Platonic *Epinomis*. However, those referred to in Archytas fit Plato's description of Theodorus better than the system presented in the *Epinomis*. The μαθήματα in the *Epinomis* are more exten-sive than the quadrivium, including stereometry and dialectic as well. If the Archytas fragment were closely tied to Platonic doctrine, and if it is even supposed to have

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⁷ Burkert, pp. 379–80 n. 46. Bowen, p. 83 seems to think that Burkert's point is that Archytas assumes two roles in the fragment, one as a transmitter of wisdom of his predecessors and another as an independent theorist.

⁸ Burkert, pp. 379–80 n. 46.

⁹ Bowen, p. 84, makes the good point, however, that Plato thinks that '*all* the sciences... reach fruition only in the understanding of their dependence and kinship'. It would thus appear that Plato could call all the sciences ἀδελφεά as Archytas does.

¹⁰ Burkert, p. 380 n. 46.

¹¹ The fact that it is the beginning of Archytas' book is one major reason that it has been preserved.

drawn the statement about sister sciences from *Republic* VII, it is odd that neither stereometry nor dialectic is mentioned.

In the end, however, the point about the use of μαθήματα is most seriously undercut by the difficulty of determining who influenced whom. Archytas was a contemporary of Plato and it is very difficult to clarify the lines of influence between them. Surely it is not impossible that Archytas already regarded certain studies (= the quadrivium) as primary and referred to them as *the* μαθήματα, especially since all our testimonia suggest that his work concentrated on just these areas (geometry A14, music A16 and 19, arithmetic A19–21).[12]

Thus all the doubts about the fragment which remain after the text is clarified turn out to be, at best, inconclusive. Furthermore, we must balance against these doubts other points which speak for authenticity. First, it should be noted that when compared to the free use of Platonic and Aristotelian terminology in the numerous texts forged in Archytas' name the use of at most one such questionable term in Fr. 1 looks insignificant. The goal of most of the forgeries is to assign Platonic and Aristotelian concepts wholesale to the earlier Pythagoreans. Second, it is significant that the description of astronomy given in Archytas Fr. 1 is of an empirical astronomy concerned with risings and settings which shows no influence of the programme for astronomy set out by Plato in the *Republic*. Such a description of astronomy is unlikely to have occurred in a post-Platonic forgery.[13]

It is hard to feel totally confident in asserting the authenticity of any Pythagorean text given the amount of forgery in the tradition. However, once the text of Fr. 1 of Archytas has been clarified there do not appear to be any serious doubts about its authenticity.[14]

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[12] Indeed, another passage in Burkert's book seems to suggest that he recognises that the use of μαθήματα is not a good means of determining the authenticity of the fragment for the very reason which I have just given: 'The question of the extent to which Pythagoreans anticipated Plato in the treatment of the four branches and the development of the concept of the μαθήματα depends on the genuineness of the long fragment of Archytas' (p. 422 and n. 123).

[13] Burkert himself draws attention to two such points. First, 'the lack of clarity about the concept of speed (rapidity of propagation or frequency of vibration)' makes the fragment a good target of Theophrastus' polemic (fr. 89). Second, the laborious enumeration of different pieces of evidence (σημεῖα) in the latter half of the fragment also suggests authenticity.

[14] I would like to thank Myles Burnyeat and Walter Burkert for reading an earlier draft of this paper and for providing helpful comments.